April 1936

United States Department of Agriculture
Bureau of Entomology and Plant Quarantine

A CAGE FOR REARING BARK- AND WOOD-BORING INSECTS UNDER FIELD CONDITIONS

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In conducting life-history studies of bark- and wood-boring insects, it is often desirable to obtain emergence records from standing infested trees. For this purpose a cage has been designed that can be placed upon the bole of an infested tree (fig. 1). Insects developing in the bark or wood covered by the cage emerge under nearly normal conditions and can be collected readily at any desired interval of time. The new type of cage was developed in 1932 and has been used successfully to rear the western pine beetle (Dendroctonus brevicomis Lec.) and associated insects in ponderosa pine and various wood-boring insects in fire-killed Douglas fir. The trees caged have in all cases been rather large, the minimum diameter being 18 inches breast high. Unless the cage were modified, it would be unsuited for use on trees of smaller size.

Construction of Cage

Materials for one 12- by 24-inch cage:

- Copper-wire screen (18 mesh) 20 by 36 inches
- Copper-wire screen (18 mesh) 5 by 18 inches
- One funnel, top diameter 10 inches
- One 2-inch tin screw cap
- Solder and soldering equipment

Flatten one side of the funnel as shown in figure 3. Solder one margin of the 5- by 18-inch strip of screen to the outside top of the flattened side of the funnel (fig. 4, a). Solder one margin of the 20-inch side of the larger piece of screen to the outside top of the rounded side of the funnel by starting at the center (x) and working first to one side and then to the other to prevent buckling. Where the two pieces of screen overlap, solder them together in such a way that a continuation of the sides of the funnel is formed.

Cut a 1¼-inch circular hole in the 2-inch screw cap. Then insert the funnel spout through this hole as far as it will go and solder the cap into place (fig. 4, c).

Collection Can for the Cage

In dry weather any jar or can with a 2-inch screw top can be used to trap the emerging insects; however, in wet weather these tight-bottom containers

are soon flooded as a result of the large amount of water intercepted by the funnel. In order to overcome this difficulty, collection cans may be constructed with strainer-screen bottoms, as follows:

Materials:

One 2-inch tin screw collar
Light-weight tin cut 6 by $7\frac{1}{4}$ inches
40- or 60-mesh brass strainer screen cut $2\frac{1}{4}$ inches square

Bend the strip of tin lengthwise around the lower edge of the screw collar and solder the two together in such a way that they form a tight cylinder. Solder the strainer-screen to the bottom of the cylinder and trim off the surplus screen. This makes a collection can 2 by 6 inches with an open screw top and a strainer-screen bottom (fig. 5). Such a collection can is readily applied to or removed from the completed cage.

NOTE: The necessary screw caps and collars used in the construction of the collection cans may be obtained from any can-manufacturing company.

Erection of the Cage

Materials:

6-penny box nails
8-penny box nails
Plaster lath
$1\frac{1}{4}$-inch roofing caps
Cotton batting $1\frac{1}{2}$ by 80 inches

Measure the area to be caged, in this case 12 by 24 inches, and mark the outline with an axe. Smooth off the irregularities in the bark in the area surrounding the portion to be caged. Fill the deep crevices in the smoothed area with wads of cotton driven into place with a $\frac{3}{8}$-inch diameter mechanic's pin punch. Next fasten the strip of cotton over the smoothed area by driving the punch through the cotton into the bark at intervals of 3 or 4 inches. This method is cheaper and much faster than nailing the cotton into place.

Attach the upper edge of the narrow screen to the lower part of the area to be caged. Using 6-penny box nails and roofing caps, nail the screen over the cotton strip by working from the center toward the sides. Then fasten the sides of the larger screen to the tree by driving 8-penny box nails through plaster lath at intervals of 6 or 8 inches. The lath should be soaked in water before being used in order to minimize splitting and breaking. Fasten the top of the cage into place with 6-penny box nails and roofing caps by starting at the center and working to the sides, pleating the screen wherever necessary. Care should be exercised in applying the cage so that the screen over the caged area will stand out from the tree trunk; otherwise the emerging insects will not fall readily into the collection jar. Figure 6 illustrates the completed cage upon a standing tree.

Special Uses

Several modifications of this cage can be designed for different conditions. The chief variables lie in the construction of the funnel and the size of the cage. By constructing a special funnel, the size of the cage can be increased to 3 feet wide by 12 or 14 feet long; such a cage is illustrated in figure 7. Cages much in excess of this size probably would not be very efficient. In the larger cages, wire brackets (fig. 2) may be placed at intervals along the caged area to keep the screen away from the trunk of the tree.

Because of their low cost and ease of application the small cages covering an area of 2 square feet are very well adapted to obtaining emergence records from a large series of trees. The cost of the materials and labor for constructing one of these small cages is approximately $1. Each cage can be used an average of 8 times; i.e., applied to 8 different trees over a period of several years.

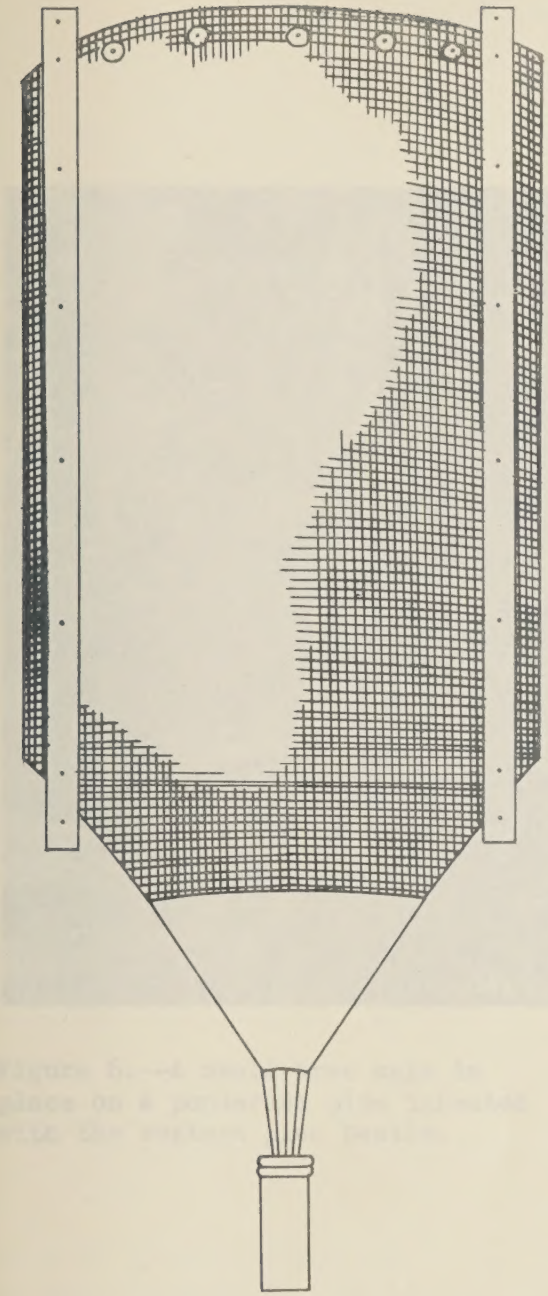


FIG. 1 - COMPLETED CAGE

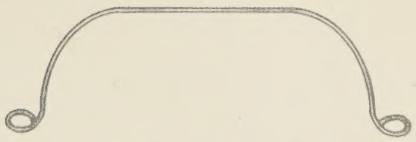


FIG. 2 - BENT WIRE SUPPORT

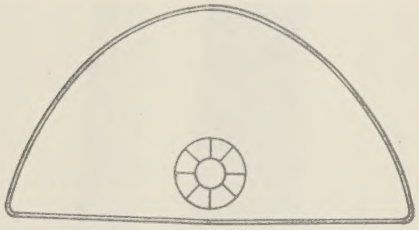


FIG. 3 - FLATTENED FUNNEL

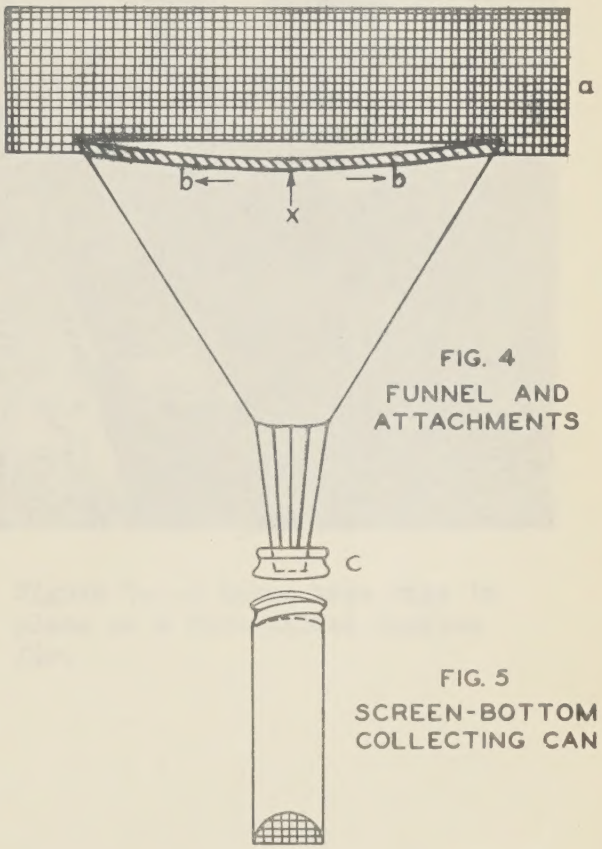
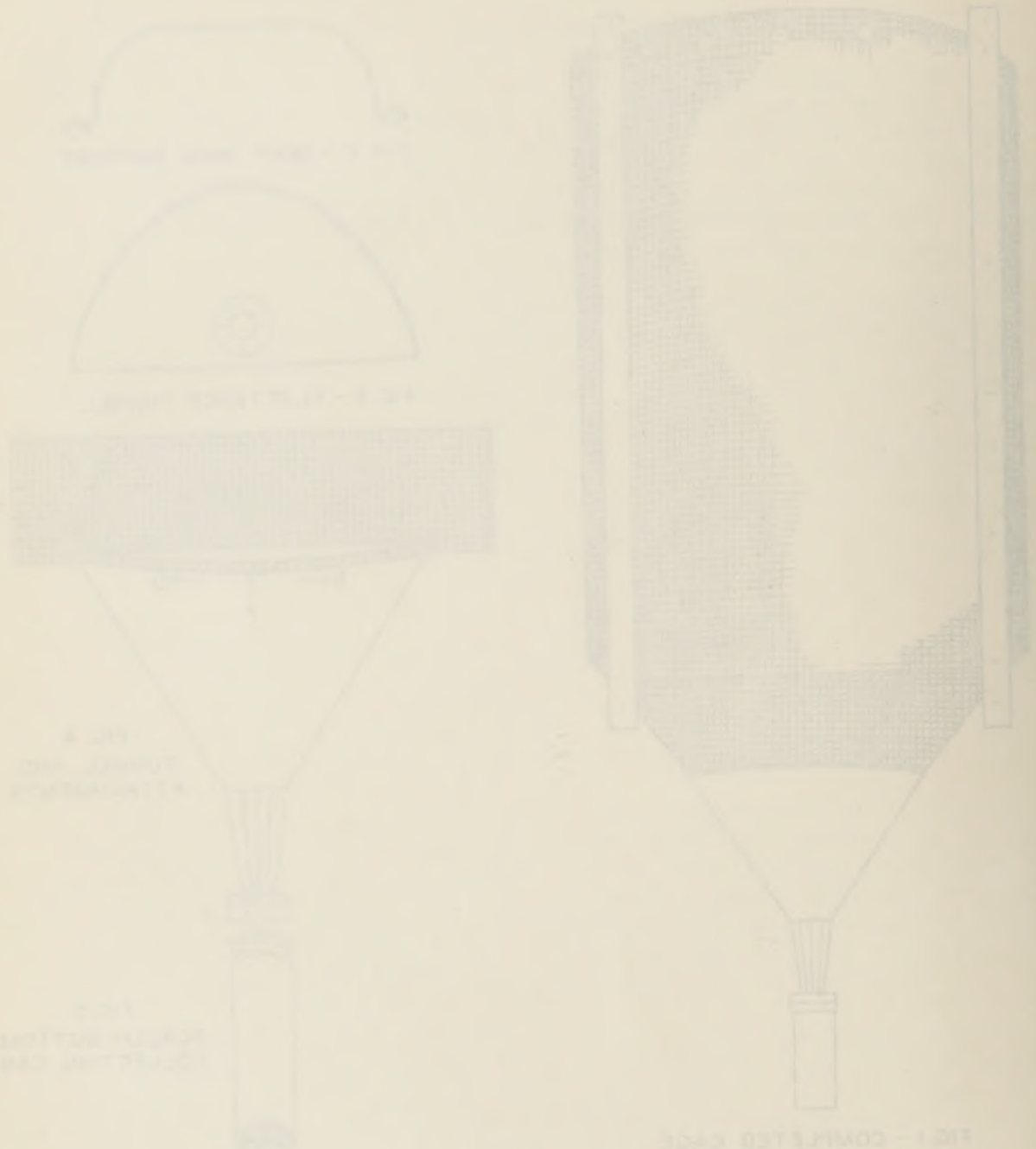


FIG. 4
FUNNEL AND
ATTACHMENTS

FIG. 5
SCREEN-BOTTOM
COLLECTING CAN

PLATE I - DETAILS OF SCREEN TREE CAGE



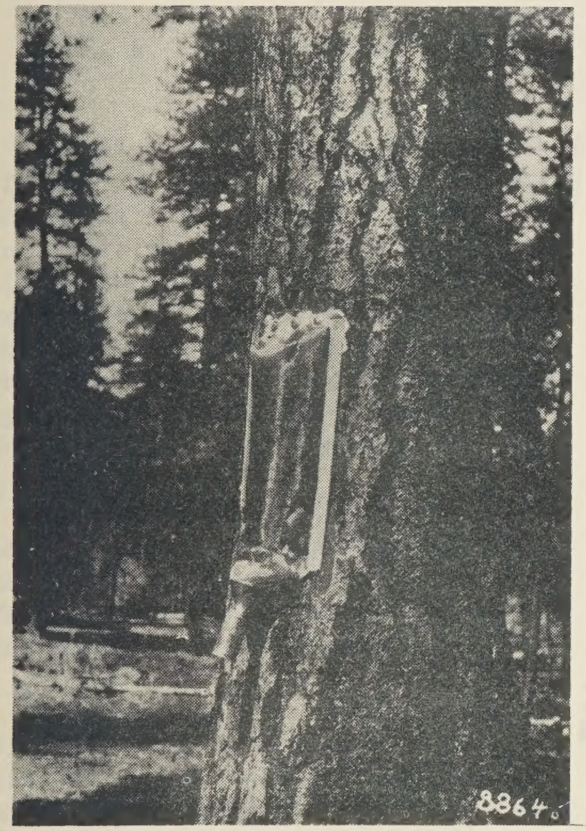


Figure 6.--A small tree cage in place on a ponderosa pine infested with the western pine beetle.

Figure 7.--A large tree cage in place on a fire-killed Douglas fir.